

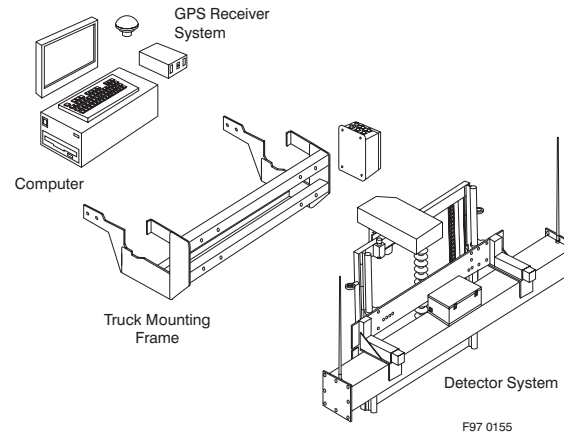
Global Positioning Radiometric Scanner System at the Idaho National Engineering and Environmental Laboratory



The GPRS is mounted on a four-wheel drive vehicle (HUMMER).

The Environmental Surveillance Program (ESP) at the Idaho National Engineering and Environmental Laboratory (INEEL) has used the global positioning radiometric scanner (GPRS) system to collect radiologically contaminated soil data (gamma-emitting radionuclides only) successfully for the past two years.

In order to more precisely locate and document radiological areas of interest, the GPRS uses an onboard computer to record the global positioning and radiometric data simultaneously. The GPRS allows the ESP to collect real-time data by updating the file every two seconds.



Schematic of the GPRS.

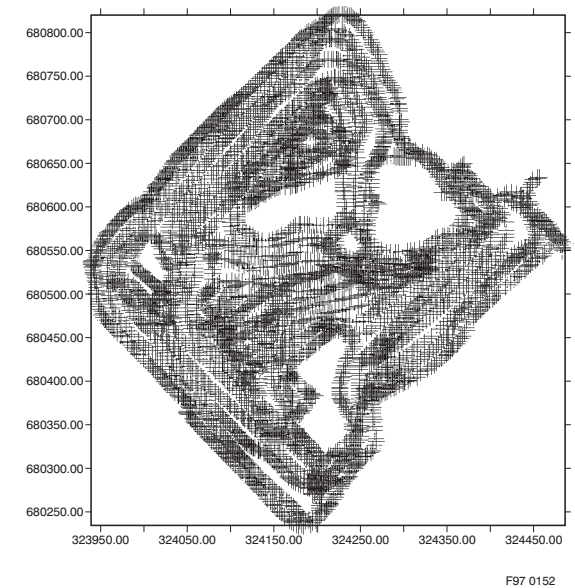
System Description

The detection system consists of two 4" × 26" × 1.5" plastic scintillators housed in an 8" × 8" × 72" white enamel steel box. A beta window and lid have been mounted on the underside of this housing. The lid can be braced open to expose the mylar windows for maximum gamma sensitivity and beta sensitivity or latched in a closed position for general use. Each scintillator uses an independent amplifier channel on a single channel analyzer board and shares a common high-voltage power supply. Both single channel analyzer channels are controlled by the same lower limit of detection and upper limit of detection controls.

The GPRS system is ideally operated at a speed of approximately 8 km/hr (5 mph) to collect the most accurate gamma radiometric data. The detectors are mounted on the front of the four-wheel drive vehicle at a height of 1 m (3 ft).

Data Collection

During operation, the detector interfaces with the computer and displays the following information: gamma radiometric data (counts per second for each detector), geographical data (latitude and longitude coordinates), time, date, altitude (in meters), and the current global positioning system (GPS) status (p/h dop). The onscreen display is helpful in tracking the areas that have been surveyed. The system records the gamma radiometric data and the associated geographical coordinates in memory.



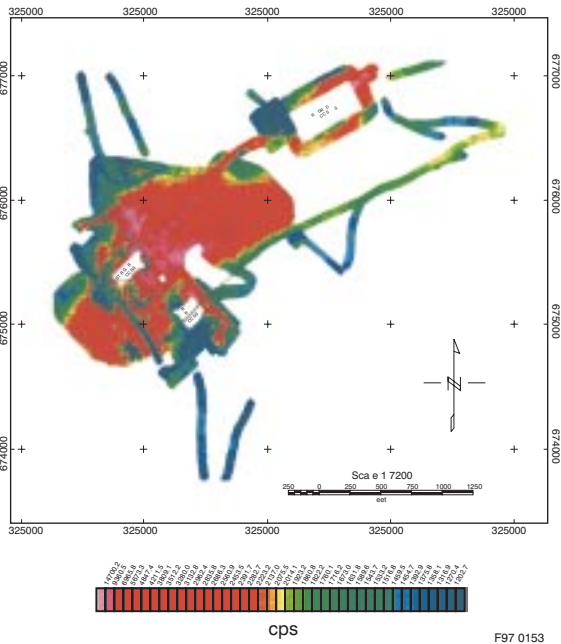
Onscreen Tracking Mechanism.

Upon completion of the data collection process, data can be saved in ASCII format and transferred to a disk. These GPS data are transmitted by a digital radio modem via the INEEL microwave to a transmitter on top of a mountain peak. At the transmitter, the data are

placed in a packet by a data radio modem and transferred via a 100-watt base station to the mobile unit. The mobile unit receives the data via a radio, and sends it through a data radio modem to the onboard computer.

Data Interpretation

Linking the radionuclide detection instrumentation with the differential global positioning data enhances the reproducibility of the surveys and is cost effective in that large amounts of data can be retrieved and recorded in a short time. These data can also be used for defining and locating coordinates for posting and fencing contaminated areas or for defining areas of interest for further characterization/remediation. The following graphic shows the results of a GPRS survey.



Results of a GPRS survey.

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